Water Reform: Ideas Whose Time Has Come

David H. Getches
University of Colorado School of Law

Criticisms of western water policy and recommendations for change have been remarkably consistent for at least twenty-five years. Recurrent themes in calls for reform have been: opening up decisions about water to wider interests; controlling demands as an alternative to continually seeking new supplies; and seeing water as the connecting thread in the use of all natural systems and resources. The ideas have been well-articulated for decades but have not been widely embraced in practice until recently.

Conditions and attitudes are now changing; there is now greater and more rapid change in water policy than at any time since the mid-nineteenth century when the prior appropriation doctrine was invented to assist the pursuits of northern California gold miners. Ecological consciousness and a new perception of the role of government in natural resource management have broadened the notion of a public interest in water and quickened political responses to once-obscure issues.

Directions in Water Policy

State and federal laws are changing in response to public pressure to bring water decisions more in line with society's values. The public wants decisions that are responsive to wide-ranging demands for the things that water does, and it wants the decision makers to be accountable for the consequences of those decisions. I believe that this points water law and policy in major new directions.

Fresh meaning will be read into old concepts like "beneficial use;" the connection between water and other resources is being better understood and will be reflected in more comprehensive treatment of water issues; and new institutions will overtake traditional ones. Already federal and state laws are being modestly reformed consistent with these predictions. Though examples of active change are few in number and cautious in their reach, the direction is clear and the trends inexorable. The results will be far-reaching and permanent, their significance only thinly masked by residual similarities in the names of present doctrines and agencies.

Beneficial Use

The beneficial use concept is the heart of the prior appropriation doctrine of western water law. Almost every western state's constitution has a provision declaring that water is a public resource but may be "appropriated" for private purposes that are "beneficial." Thus, the people of the state control how water is to be used, allowing private parties rights to use it in ways that benefit the public.

Some early cases disallowed extremely wasteful uses because they were not beneficial but it was not necessary then to draw lines to define precisely which uses were beneficial, and which were not, under particular circumstances. The public's interest for most of a century was in promoting economic activity and that was best done by recognizing as "beneficial" any reasonably efficient water use that resulted in production of goods.

As competition for water has grown more intense, relatively inefficient uses have been drawn into question. In the nineteenth century, crude irrigation practices were commonplace and the water they lost through seepage and evaporation was considered to be used beneficially. But these losses now seem excessive in light of the more efficient, modern methods that are available. Courts and water administrators are showing less tolerance for unlined earthen ditches and excessive flooding of fields in an era of simple technologies for ditch lining and drip irrigation.

Challenges to wasteful uses came first from other private users like farmers, cities, and industries with a demand for the water wasted. Now they come also from citizens' groups and governments who perceive substantial value in having clean, free-flowing streams. Water users are under substantial pressure to adopt reasonably efficient means for diverting water from streams or wells, for transporting water and for putting it to use. Plainly, the public has an interest in how an essentially public resource is used. At the most fundamental level, this requires reasonable efficiency — that the resource not be wasted.

Increasingly stringent standards are being applied to new and existing water uses whenever administrative officials and courts have an opportunity to review them. New applications for water rights are viewed differently than in the past. Requests to authorize transfers or changed uses of old water rights exposes them to stricter reevaluation. Some states, like Oregon, have initiated reviews of all existing rights to determine whether the uses are efficient, that is, genuinely "beneficial."

High-sounding but often hollow provisions in virtually every western state's laws require that the grant of a water right must be in the "public interest" or promote the "public welfare." These phrases are designed to assert and protect the public character of all water before and after it is

appropriated for private use. Yet they generally lack definition. Legislatures, courts, and water administrators are only beginning to read greater and more specific meaning into public interest requirements. The public interest includes a range of uses: instream flows for fish to domestic water supply, aesthetics to flood control, boating to fire suppression. However, there must be some way to decide what weight to give to all of these multiple interests of the public.

The use of water rights can presumably be regulated far more extensively than, say, land use because most land is not considered a public resource and privately-owned interests in land are not subject to a beneficial use condition. Ironically, there has been far less regulation of water use than land use. Some state laws gratuitously protect private water rights from any interference by public water quality regulation. This is the result of the enormous political influence of senior water rights holders in the West. It comes at the expense of other users and of the rest of the public who depend on the same water source for a panoply of uses. But the balance is tipping in favor of the public.

The beneficial use requirement can be fulfilled through economic forces as well as through regulation. Those forces include fuller use of the market system, pricing and taxation, and elimination of subsidies for uses of questionable public benefit. Inefficient uses can be eliminated through operation of the market system. Where water use results in "hidden" costs to the public, such as destruction of wetlands, topsoil loss, and water pollution, those costs can be reflected better in decisions to develop or use water if commensurate charges or taxes are imposed on the water users causing the problems. By contrast, the past practice has been to subsidize wasteful, inefficient, and environmentally destructive water projects and uses. Subsidies are now in disfavor for several reasons apart from the wrongheaded behavior they encourage; public treasuries are too depleted to build major water projects or to operate them at a loss.

If water rights are transferred in an open market they tend to move away from the least efficient uses to more efficient and economically productive uses. There are still impediments to water markets, however. Water rights are recognized as property but some states freight transfers with practical and legal requirements. Transferability of water rights can be freed up by repealing market-inhibiting laws and by reducing unnecessary costs of cumbersome and needless administrative and judicial systems for reviewing transfers and other changes of water use.

Some public review is needed to screen out transfers contrary to the public interest while other procedures serve little useful purpose. A National Academy of Sciences panel made this distinction in a recent report entitled *Water Transfers in the West: Efficiency, Equity, and the Environment* recommending better public interest protection in water transfers. Lengthy trials are now held to decide with precision exactly when and to what extent a new well will affect an old surface diversion. Sometimes more is spent on legal wrangling than the water is worth, but little of it on ensuring public benefits.

Throughout the West, water is becoming more marketable. Environmentalists have embraced the free market as a means of satisfying expanding water demands without the necessity for constructing large, environmentally intrusive dams and facilities. New pricing techniques are being adopted by some suppliers as a way of sending signals to users about the "true cost" of water. Instead of charging new consumers a rate that reflects the average cost of all water in the system, "marginal cost pricing" results in charging them higher rates based on the cost of developing new water supplies. Urban systems are turning also to "inverted block" rates that charge consumers more, not less, as monthly usage rises.

States are beginning to consider assessing charges on the existence or exercise of water rights. This discourages overuse and overclaiming of rights. For instance, Arizona charges for groundwater depletion. Where pumping results in depletion of a nonrenewable resource, causes subsidence of the overlying land, or makes pumping by other users more difficult, there is a clear rationale for charging pumpers. Likewise, if there are costs imposed on present or future water users as a result of removing water from a stream, a charge is readily justified. This is the case when water is exported from one watershed for use in another. Charges attached to water use can reflect specific costs that are deflected onto the public and also remedy old damage by restoring riparian habitat or rehabilitating stream corridors.

Integrated Water Policy

A policy of integrated water management has had various meanings. One dimension of integrated water uses is geographic, usually the basin or watershed. Early proponents talked about "integrated development" in reference to coordinated development of an entire river basin. This meant finding the optimal placement and operational patterns for dams and other structures.

Another dimension is practical. Integration refers to all kinds of arrangements among water users to make better use of existing facilities and supplies. Irrigators agree to rotate their uses, sharing reservoir storage regardless of who has "legal rights" to use water. Innovative transactions allow cities to "borrow" the farmers' clean water in return for supplying nutrient-rich wastewater for irrigation. The practical dimension of integrated management plainly favors alternatives to new structural solutions to water supply questions.

Integrated water management may look even far-

ther to the whole cycle of water use. Consideration of whether and how to put water to use raises related issues of wastewater treatment and discharge and the quality of water available for other uses. Today, the integration of management reaches non-consumptive and non-traditional uses like fish and wildlife, recreation, and wetlands protection. For instance, the timing of diversions and reservoir releases can be adjusted to allow for instream flow protection. The list of creative schemes for tying together users and uses of common sources gets longer daily.

Connecting economically beneficial uses with the effects on natural system and vice-versa signals a new dimension of the concept of integrated water management. It ties water uses to almost all other resource uses and social welfare to ecological health. The earliest examples of this awareness were in the soil conservation movement. The manner and use of lands and of water had obvious interrelationships. Use too much irrigation water or apply it in the wrong way and it will cause soil to be lost; and with the soils goes productivity. Use poor cropping practices and erosion will glut streams with sediment, destroying the utility of surface water supplies (as well as fish life). Similar interrelationships have long been obvious in the area of floodplain management.

Despite early roots, the dimension of integrated water management that connects uses of water to broad ecosystem and social well-being is new to the consciousness of most water managers. Enlightened policy recognizes that what we do with water, besides affecting everyone else who depends on related water sources, and besides affecting natural ecosystems, has broader economic and environmental consequences. Failing to acknowledge the legitimacy of all the stakeholders who are implicated by a water decision, or refusing to deal with the related problems and issues and impacts, is short-sighted.

Widening the considerations and interests in a water decision obviously complicates the business of water policy. But this is a necessary complication in a system where too much simplicity is now a fault. The system serves the narrow economic interests of those whose historical position gave them a legal right to use water. It creates a false simplicity that denies the physical, political, and economic realities of water use. Greater complexity in decisionmaking is an inevitable result of dealing fully and fairly with water decisions.

To deal better with the complexity of water decisions some states have embraced comprehensive planning. This is a dynamic process for considering a variety of issues with wide public participation, making some generic decisions in advance, and setting long-range goals. Kansas has led the way with its continuously revised "plan," which is actually a collection of policy documents developed with ample public participation and then adopted by the legislature. The plan comprehends diverse subjects like wetlands, flood control, and water conservation. Once accepted, the elements of the plan guide related government agency decisions.

Impact assessment is another technique for dealing with multiple factors involved in water decisions. The great potential of this approach still has not been realized. The National Environmental Policy Act (NEPA) made impact assessment the business of every federal agency. Surely the revelation of environmental problems and of less damaging alternatives to proposed projects through environmental impact statements has led to better considered decisions.

Although the effect of NEPA is limited by its applicability only to federal projects, several states have passed similar laws that apply to all large projects, public and private. These NEPA-like laws could become a greater force in reviewing water decisions though their role has been somewhat limited in the past. States without them could adopt "little NEPAs" and states with them could specify additional kinds of water decisions and policies that can trigger the requirement for an assessment.

Another way to deal more comprehensively with water issues and decisions is through broadening the mission of agencies. Water agencies often have only a single purpose. Water rights allocation and enforcement are almost always separated from pollution control. States spread water responsibilities around two or three water agencies that deal separately with allocation, quality, development, and other issues. Groundwater and surface water are administered in different agencies. California has a huge state agency to oversee all aspects of water use, but it leaves groundwater management to a hodgepodge of local or regional authorities. In most states, water responsibilities within the same watershed are under the control of several districts and cities.

The ideal of integrated water management represents a new and holistic way of thinking. First and foremost, it requires a broad understanding of linkages. Ecological science can be coupled with the concept that connections among humans create wide communities of interest. Laws facilitate the incorporation of this understanding into the way decisions are made. They require decisions at all levels to be more comprehensive and they require reforming the entities that make decisions. This relates to another trend: moving water decisions into new or reformed institutions.

New Institutions to Make and Implement Policy

Change in water law and policy will be facilitated by more appropriate institutions for water decisionmaking. Inertia in government resists abolishing or replacing institutions — well-established agencies and laws. Yet major reform of procedures, jurisdiction, and functions can give

old institutions new missions and mark substantial policy reform.

Ideally, the geographic jurisdiction of an entity should be conterminous with the range of effects of the entity's decisions. The decisionmaker should be accountable primarily to people in that area. Some decisions need to be more localized, others need to be broader. In the past, decisionmaking has often been at levels that allowed them to be made without accountability. Decisions that caused mining of the Ogallala Aquifer were too localized. They disregarded major interests of the overlying region and of future generations. They were made by individual pumpers and irrigation districts whose responsibilities were limited in purpose and geographic reach. Only when entire states, groups of states, and the federal government began to address the issue together were any remedies possible.

Institutions whose authority spans state boundaries are rare but the idea is finding a warmer reception. Interstate streams cannot be well managed by a multiplicity of competing state agencies. Some institutions need to be defined by watershed boundaries. The watershed often is the area where most effects, positive and negative, are to be felt. This led the Congress to pass legislation in 1965 providing for the establishment of river basin planning commissions. The idea was not widely embraced and only a few of the original commissions survive today. The concept was not packaged appropriately for many of the basins and was resented because it disregarded state roles.

Notwithstanding the largely unsuccessful effort at basinwide planning of the 1960s and 1970s, the idea is reemerging. Now basins are coming together in a variety of contexts and forms to pursue their common interests. The paradigm is represented by the Northwest Power Planning Council that unites many of the interests in the Columbia River watershed. States and tribes share much of the great responsibility for managing a vast hydroelectric system that was once vested in the federal government. In the process, they also effectively yield some of their governmental prerogatives to one another by exercising their individual sovereignty for mutual benefits. They control fishing or water diversions within their respective jurisdictions and everyone is better off. As native runs of Columbia River salmon dwindle, the Council is proving to be an indispensable vehicle for cooperative and comprehensive management of multi-state resources. The entity's effectiveness appears to be confined mainly by limits on its authority and responsibility over resources like fish and water.

Designing water institutions to be accountable often requires down-sizing them. Water decisions affecting primarily a single watershed may be best managed by entities closer to the watershed or even a sub-watershed. State level decisions can disregard the interests of the people most affected. In Oregon local initiative has resulted in basin councils to do planning for water use close to the grassroots. Recognizing the frequent failings of broad brush approaches, EPA has initiated a watershed-oriented planning process.

Some existing institutions need to have expanded authority and responsibilities. An irrigation district whose sole responsibility has been to provide irrigation water may charged with controlling nonpoint source pollution generated by water users in the district. Controlling water quality and allocating water for use are typically addressed by totally different laws and agencies with different policies governing them. This ignores the water quality consequences of a water allocation decision and the effects of existing water uses by allowing changes in water quality. Some states have reorganized agencies to merge fragmented responsibilities.

Conjunctive management of groundwater and surface water also depends on redefining institutional responsibility of state governments. The logic of including surface water and hydrologically connected groundwater in the same management regime under the same agency is inescapable, yet some states still treat surface and ground water as unrelated. Even where there is little or no hydrologic connection it makes sense to consider all available water to be part of the same resource and to use surface and groundwater to achieve an optimum level of sustainable water use.

Once the geographic and functional scope of institutions has been decided there must be a way for the affected publics to participate. Without opportunities for meaningful participation in decisions, attempts to protect the public interest will fail. Interests affected by water decisions and water policymaking include everyone from farmers to traditional Hispanic communities such as those that exist in northern New Mexico, Indian tribes, basins where water that is exported originates (like the West Slope of Colorado or Northern California), boaters, scientists, and anglers. All of these groups have identifiable interests that deserve to be represented.

The forum for weighing these interests may be a hearing held to inform the decisions of a state engineer or water board. In Idaho, for instance, rules have been rewritten to expand the process to admit and even to invite interested members of the public to participate in hearings that historically were dominated by water rights holders.

Sweeping alterations can occur throughout the West within the apparent framework of the existing system; they are already happening. The resulting system need not be replaced but can retain certain traditional emblems, and the transition will generally respect most rights and established expectations. Others argue that the prior appropriation system is so flawed and arcane that it should be thrown out.

That result is neither likely nor is it desireable before other reforms are tried. Most western water is already tagged with water rights that cannot be undone without major political upheaval and economic dislocation. Because there are expectations that would be severely disappointed if the present system were prematurely scrapped, fairness counsels that attempts at reform within that framework should be exhausted first.

A Time for Change

The pace of change in western water policy has been slow, halting at times. If you were to ask 20 or 30 years ago about trends in water policy, you might hear predictions of new ideals for "beneficial use," including greater consideration of the "public interest," more integrated and comprehensive water decisions, and reform of existing water institutions. Though these directions were in the vision of some people decades ago, they have only recently become practically and politically timely.

The essential ideas that would support the kinds of changes predicted here were developed long ago. They were well synthesized and articulated first by geographer Gilbert White, one of the earliest and most insightful scholars to urge consideration of these issues. He recognized that the course of water development and use was only superficially a function of the physical capacity to develop a river or aquifer. He pointed out that the "degree to which those limits are approached is related to conditions which are partly technological, partly economic, partly political, and partly ethical" (White, 1957). Thus, he called for a comprehensive approach to natural resource management, traceable to his 1945 dissertation (White, 1945) that drew on the ecological understanding of George Perkins Marsh. Accordingly, he argued that identifying and overcoming "the deficiencies in water laws and institutions . . . requires an interdisciplinary approach, rather than a narrow, legalistic one" (White and Haas, 1975).

Gilbert White demonstrated that the most fruitful work in dealing with future water issues would be in increased efficiency in irrigation and water conservation (White and Haas, 1975). He argued that the range of choices open to water decisionmakers had been artificially curtailed in favor of perpetuating withdrawals for more and larger consumptive uses (White, 1960; White, 1961). He explained that truly comprehensive management of water means more than just securing multiple benefits from water projects or planning for water development for an entire basin at once. Considering and administering land and water resources together to pursue the goal of improving quality of life, however, remained an unsatisfied ideal of comprehensive regional development (White, 1957).

Twenty years ago, it may have appeared that White's counsel favoring more comprehensive water decisions was coming to fruition in policy. Consider what was happening then. In 1972, the Clean Water Act was enacted with a goal of restoring fishable, swimmable waters. This tied pollution control to non-consumptive uses of water. The Water Resources Planning Act had been passed a few years before, incorporating watershed management and planning.

In 1973, the National Water Commission released a 550 page report entitled *Water Policies for the Future*. Many of its 232 progressive recommendations were consistent with the "new" trends suggested here. The Commission acknowledged the importance of public values and recommended concrete changes in law and policy to secure protection of instream flows "in order to maintain scenic values, water quality, fishery resources, and the natural stream environment." Other recommendations pressed for the conjunctive management of groundwater and surface water. The report recommended "comprehensive river basin and regional development plans" and suggested that water and related land resources planning be done by new entities established for river basins.

In the last twenty years, there has been a proliferation of government reports, scholarly literature, and popular works favoring changes in water policy. Common themes abound, though many writers appear to have reached their conclusions independently, without relying on one another and without citing the National Water Commission's report or the pioneering work of Gilbert White. Nevertheless, nearly every modern commentator observes that construction of major projects is no longer the primary answer to water problems and urges greater efficiency in water use and management. Most are also concerned with the failure of traditional policies to protect to public values in water like aesthetics, wildlife, ecological integrity, and community identity. They often observe that broader planning and basin management are preferable to present approaches. Lawyers, economists, political scientists, geographers, citizen groups, and government commissions all have reached remarkably similar conclusions.

While there has been little disagreement on the types and directions of policy changes that are warranted, until very recently, there has been little response by legislators and administrative agencies. There are several explanations for this failure.

Even as he wrote, White saw that the realization of his vision of integrated water policy "as more hope than reality." A report of a National Academy of Sciences panel on the Colorado River (chaired by White) acknowledged that "political, legal, institutional, and attitudinal constraints . . . limit most water planning . . ." (NAS, 1968). White always understood the obstacles to changing away from the narrow mindset that encouraged ever-expanding supplies of water rather than budgeting existing supplies among competing uses:

> Current pricing systems, water rights law, and public attitudes are largely opposed to readjustments in use priorities. They can be expected to change slowly at best and then only in response to severe cases of misallocation or to persistent public education that paves the ground for revision in public attitudes and institutions. (White, 1960)

Although the impediments seen by White existed for many years, conditions are now changing.

First, there has been a major shift in the federal government's role. It used to be primarily a financier; it now plays a regulatory role in water resources. For many years public policy assumed that population and economic growth must be supported with constant growth in new supplies of water and that government was obliged to assist in developing them. The momentum of pork barrel politics propelled the traditional role of the federal government as financier, eclipsing the logical force of the National Water Commission's recommendations.

The powerful coincidence of overcommitted federal revenues and a rise in sentiment for environmental regulation finally caused a change in the federal role. The government's regulatory role has become enormous. The Endangered Species Act has done as much as any other law to change the way state water rights are used. Section 404 of the Clean Water Act introduces federal oversight of the "public interest," even in reviewing essentially private activities that require any kind of federal license or approval.

The political climate is better for water policy change now than in the 1970s. When President Carter proposed to kill eight federal water projects authorized to be constructed in the West in his 1977 "hit list," the reaction was panic and disdain. The Carter decision to require future water projects to satisfy environmental assessments and cost-benefit analyses was widely disparaged. Today his position is the conventional wisdom.

A second reason that predictions of change may be more reliable now than they were 20 years ago is the rise in environmentalism. Though the movement had earlier stirrings, it came to fruition in the 1970s and 80s. We will see the movement's values reach unprecedented acceptance in the 90s and beyond as a concern for sustainable resource use is linked to all major policies and, ultimately, to human survival.

The seeds of environmental awareness were planted back in the 1900s by the early conservationists. They took root with disciples in the soil conservation movement in the 30s. Perhaps the most enduring spokesman of all was Aldo Leopold whose common sense rhetoric reached the comprehension of everyone. Furthermore, his "land ethic" as a moral justification for environmentalism has yet to be surpassed by philosophers.

Rachel Carson's *Silent Spring* was recently named the most influential book of our time by a panel of leading Americans. It riveted public attention on issues that had not been considered before the 1950s. Consciousness was heightened by Earth Day and by a series of disasters like Love Canal. But the onslaught of federal environmental law was the single greatest factor in putting environmentalism into action. After 20 years of environmental law enforcement, environmentalism has found credibility in our society and its practice is a permanent force in public policy.

Public opinion polls show quickening support of environmental protection. A Gallup poll showed that, in the midst of national economic distress, environmental protection ranked in the top three issues for the 1992 presidential election and in the public's consciousness. At the 1992 Earth Summit in Rio, a dynamic force coalesced behind both governmental and nongovernmental efforts to achieve environmental protection. That force will continue as international networks of nongovernmental organizations and indigenous people keep watch over governments that pledged new allegiance to the earth's ecological integrity.

Indeed, environmentalism has an ethical dimension. A greater ecological understanding provides a foundation for making ethical judgments about resource use. People are beginning to appreciate the interconnectedness of things as they comprehend ecological science. Today's children, tomorrow's leaders, understand better than we ever did the realities of resource conservation. Part of that understanding is an appreciation that water binds resources together ecologically and that, therefore, water policies and decisions are profoundly important to the environment. This leads to the kind of changes White said were necessary to forge new public attitudes and institutions.

The third reason that I believe that these trends are real is that there is heightened public awareness of water issues. The public is learning the serious consequences and trade-offs involved in committing water to one use as opposed to another use. They understand better than ever before the consequences of overuse and misuse of water, partly because of positive media work. The Pulitzer Prize-winning *Sacramento Bee* series on the Kesterson disaster that turned an agricultural drainage catchment into a lethal wildlife refuge, is one example. In-depth works like Marc Reisner's best-selling *Cadillac Desert* on the culture of water development and his sequel with Sarah Bates, *Overtapped Oasis*, on how that culture has changed, have informed people who had never thought about water issues before.

There has also been a political re-definition of issues. In Congress, Rep. George Miller, Senator Bill

Bradley, and others in leadership positions are forcefully asking questions and proposing solutions that were unthinkable 20 years ago. The Western Governors' Association (WGA) has taken leadership on water efficiency that has motivated significant changes in state laws and congressional attitudes. Together with the Western States Water Council, WGA is taking a hard look at reforms that are possible in water law in order to incorporate the public interest, stuff that was absolutely unheard of and revolutionary only a few years ago.

The public is ready to pay the price of change, too. Once citizens are armed with the facts about the consequences of a water decision, I believe they are willing to make hard choices and even sacrifices. There is some evidence of that. The peripheral canal proposal in California was killed by Southern California voters, the supposed beneficiaries. The polls told us during the Two Forks debacle that the people in Denver, who were to use the water from that project, were against it. Once they learned of the damage it could do to a great canyon and river near the city, as well as to headwaters areas across the mountains, they were ready to reject development of Two Forks.

In the 1985-1992 drought in the far West, citizens showed a higher consciousness about the need to conserve resources. Water suppliers asked consumers to conserve voluntarily, and they responded by reducing water use well beyond predicted levels. In fact, conservation was so successful that it created a financial problem for some suppliers because they weren't selling enough water.

In the Northwest, unlikely coalitions are forming to protect endangered species of salmon. People, not all of whom are primarily interested in wildlife — power producers, irrigators, city officials, commercial fishermen, Indian tribes, Chambers of Commerce, and environmentalists — have joined together with Idaho Rivers United to seek sustainable ways to use the waters of the Columbia.

There is also a wave of new state water legislation that supports the three trends. As of spring of 1992, there were over 100 pending water bills in the areas of water transfers, conservation, water quality, groundwater, public trust, and planning and policy.

The next two decades of water policy, I think, will see the greatest changes in western water policy since the prior appropriation doctrine was invented. Old concepts like beneficial use will achieve new meanings, existing institutions will change, and new institutions will be formed. Integrated water policy can, at last, become a reality.

References

Foster, Charles and Peter Rogers. 1988. *Federal Water Policy: Toward an Agenda for Action.* Cambridge, MA: Energy and Environmental Policy Center, John F. Kennedy School of Government.

Getches, David. 1988. "Water Planning: Untapped Opportunity for the Western States." *Journal of Energy Law & Policy* (9):1.

Leopold, Aldo. 1949. *A Sand County Almanac.* New York: Oxford University Press.

Mitchell, Bruce, ed. 1990. *Integrated Water Management: International Experiences and Perspectives.*

National Academy of Sciences, National Research Council. 1966. *Alternatives in Water Management..*

National Academy of Sciences, National Research Council. 1968. *Water and Choice in the Colorado Basin.*

National Academy of Sciences, National Research Council. 1992. *Water Transfers in the West: Efficiency, Equity, and the Environment .*

U. S. National Water Commission. 1973. *Water Policies for the Future: Report to the President and Congress .*

Wescoat, James L. 1984. *Integrated Water Development .* Chicago: University of Chicago, Department of Geography.

White, Gilbert F. 1935. " Shortage of Public Water Supplies in the United States During 1934." *Journal of American Water Works Association* (27): 841.

—. 1945. *Human Adjustment to Floods.* University of Chicago, Dept. of Geography Research Paper No. 29.

—. 1957. "A Perspective of River Basin Development." *L. & Contemporary Problems* (22):157.

—. 1961. "The Choice of Use in Resource Management."*Natural Resources Journal* (1): 23.

—. 1965. "The Changing Role of Water in Arid Lands." Reprinted in I. Burton and R. W. Kates, eds. *Readings in Resource Management and Conservation.* Chicago: University of Chicago Press.

White, Gilbert F. and Haas. 1975. *Assessment of Research on Natural Hazards.*

Note

An extended version of this article will appear as a chapter in a forthcoming book on trends in natural resources policy, edited by Lawrence MacDonnell and Sarah Bates. The book is being published by Island Press in the Fall of 1993. (Contact Island Press at 1-800-828-1302.)